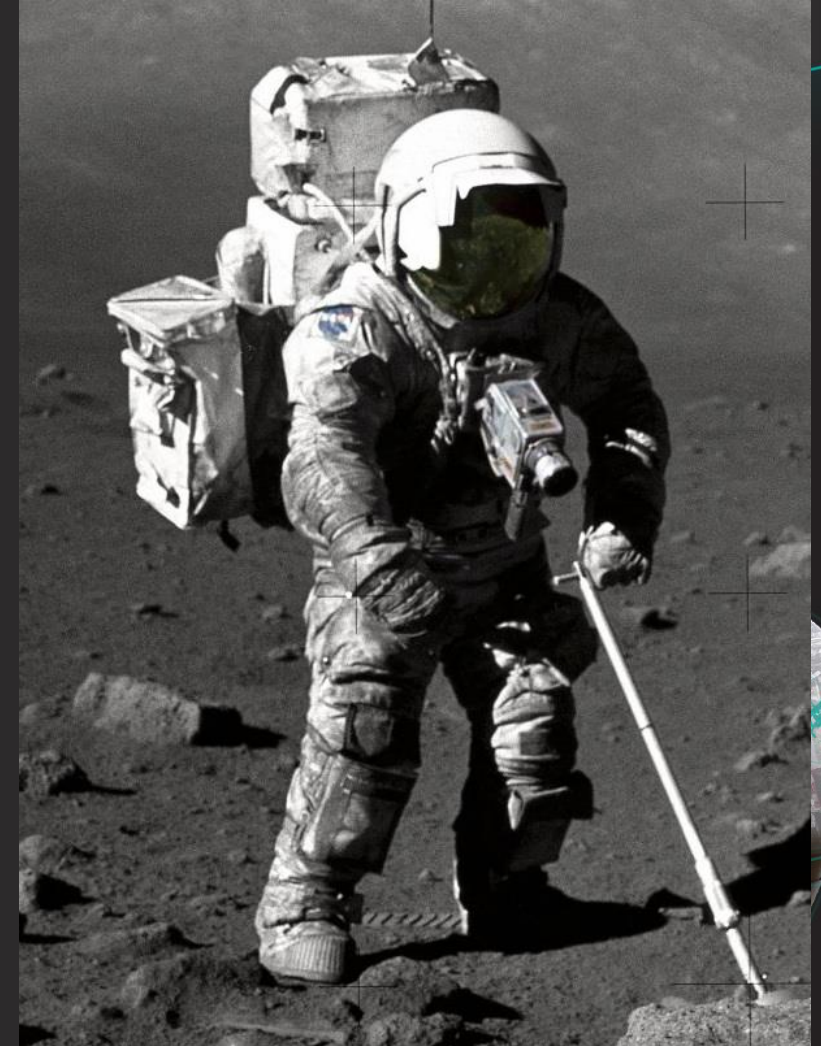


Dust/Regolith for Surface Exploration



- ▶ System-wide dust protection is a key design driver for xEMU surface operations, and development of dust proof mechanisms, bearings, materials, and coatings coupled with specific operations and surface architecture development is critical for success.
- ▶ Dust Proofing on the xEMU should protect against the following damage mechanisms
 - ▶ Dust Abrasion
 - ▶ Dusty surface directly damages outer material, resulting in reduced properties, additional migration and damage to other layers.
 - ▶ Mitigate through patterning (twill weave common in clothes), base materials selection, and protective coatings
 - ▶ Dust Adherence
 - ▶ Can change the thermal performance of the system, or introduce regolith and dust into the airlock or cabin environment, potentially harming crew members.
 - ▶ Mitigate by making the surface cleanable, or control the surface charging
 - ▶ Dust Penetration/Permeation
 - ▶ Create abrasion risks to fabric layers or other captured features beneath the outer layer and create damage
 - ▶ Mitigate by choosing tighter-weaves, closing gaps in integration, or using coatings to fill space of fabric
 - ▶ Choose fabrics that don't abrade other layers
- ▶ Current philosophy is fully integrated dust mitigation strategy with the TMG and exposed suit components
- ▶ Over garment, bunny suit, or "coveralls" could be considered as contingency or as an additional mitigation option for xEMU surface operations.



Wish List For xEMU Dust Environments



- ▶ Development of materials and coatings
- ▶ Dust-proof bearing and mechanism designs
- ▶ Softgoods designs and patterns for dust-mitigation
- ▶ Solutions to system level architecture and operations concepts, including airlocks and other surface architecture.
- ▶ Cleaning and maintenance operations for dirty surface environments

